

## AMENDED CLAIMS

[received by the International Bureau on 7 February 2001 (07.02.01);  
original claim 1-17 replaced by amended claims 1-16; (2 pages)]

- 10069000
- Sub A1
1. A thermocouple comprising a sensing tip in electrical connection with a mineral insulated thermocouple cable characterised in that additional external shielding is provided by a low temperature sintering refractory material including particulate borosilicate and boric acid powder.
  2. A thermocouple as claimed in claim 1 characterised in that the shielding is in the form of a sheath having inner and outer metal tubes constricted over a filler of low temperature sintering refractory material.
  3. A thermocouple as claimed in claim 2 in which the outer tube is mechanically constricted to compact the filler.
  4. A thermocouple as claimed in claim 3 in which the constriction is effected by drawing, swaging or rolling.
  5. A thermocouple as claimed in claim 1 in which the borosilicate comprises between 6% and 10% by weight of the refractory material.
  6. A thermocouple as claimed in claim 5 in which the boric acid comprises about 3% to 5% by weight of the refractory material.
  7. A thermocouple as claimed in claim 5 or 6 in which the boric acid content of the refractory material is about one half of the borosilicate content.
  8. A thermocouple as claimed in any one of claims 2 to 7 in which the tubes of the sheath are stainless steel.
  9. A thermocouple as claimed in any one of claims 2 to 8 in which the refractory material is predried at a temperature of between 135° and 150°C.
  10. A thermocouple as claimed in claim 9 in which the refractory material is at least partially sintered before the thermocouple is used.
- Sub A2

11. A thermocouple as claimed in any one of claims 2 to 10 in which the refractory material is beaded before being formed into the sheath.

12. A thermocouple as claimed in any one of the preceding claims in which the tip is formed from a thermocouple cable with a negative metal tube housing a positive wire embedded in a low temperature sintering material as defined in any one of claims 4 to 7 above.

13. A thermocouple as claimed in any of the preceding claims 1 to 11 in which the tip is formed by providing a hot junction from the wires of the thermocouple cable and supported by a sheath as above defined with both tubes and the refractory formed to cap the hot junction.

14. A thermocouple as claimed in any one of claims 2 to 13 in which the outer tube of the sheath is annealed after the constriction process and the refractory material at least partially sintered during the annealing process.

15. A method of shielding a thermocouple comprising locating beads of suitably bound refractory material between an inner metal tube and an outer metal tube and reducing the sheath down to a predetermined size by drawing swaging or rolling during which process the beaded refractory material is compacted between the inner tube and the outer tube.

16. A thermocouple substantially as described and illustrated in Fig 1 or Fig 2 of the accompanying drawings.